

Images, Plans, and Schemas

Reynolds talked about how much soda pop he was going to drink the rest of his life. Cherry couldn't think about anything but chocolate ice cream. As I listened to the thirsty talk between the rafts, my own mind slowly filled with visions of chocolate malted milk. I could actually taste it, to the point where my tongue worked convulsively. The strange part is that I hadn't had a chocolate malted milk in nearly 25 years.

—EDWARD V. RICKENBACHER*

In the last chapter, we looked at the behaviorist account of goal-directed behavior. In the present chapter, we will look at it from the cognitive point of view.

We saw that the basic question of purposive behavior is: How can we get the future into the present? How can our actions be affected by things that haven't happened yet? The reinforcement answer is: They are not. What look like effects of future events are really effects of past ones, that is, of our histories of reinforcement.

The cognitive theory takes a different approach. Its answer to our question is: In a sense, we do get the future into the present, because we can imagine it now. Future outcomes affect what we do because we expect, or want, or hope for, imagined future events.

IMAGES*

Let us begin by asking what images are, and how they can be used.

A few minutes ago, a student wandered unsuspectingly into my office. Just so I could write this section, I asked a minute of her time to do some strange-looking favors for me.

"Close your eyes," I requested. She did. "Now, do you know where the clock on my wall is?" She nodded. "Point to it, please." She did, quite accu-

*Quoted by Wolf, 1958, p. 435.

rately. “Now suppose it were lowered three feet. Point to where it would be.” She did, again quite accurately I thought—I did not measure the error, though I could have. “Thank you,” I said, and she replied, “You’re . . . uh . . . welcome.”

Now let us look at what she was able to do. She pointed to an unseen object, much as she would have done if it were seen. She used a *memory image* as the target of her pointing. Then she *manipulated* the image. Having moved the clock in her mind to a new location, she could point to it as if it had actually been moved—but without the effort and danger of actually moving it. That is what makes such capabilities so valuable, as we will see.

Thus we have a preliminary conception of what an image is. It is an internally generated process that can provide some of the same information, and guide our actions in some of the same ways, as externally generated stimuli can. We can shorten that by saying that an image is an internal *representation* of some state of affairs. We can represent an actual state or, by manipulating the image, a potential or possible one.

A word of caution, however. This does *not* mean that an image is a “picture in the head” of the external event. An image may or may not be visual, and it may or may not be conscious. And it can *represent* an external state of affairs without in the least having to *resemble* one. A picture can represent an actual scene, and resemble that scene; but a verbal description can also represent a scene, yet the speech sounds or the words on paper do not resemble the scene at all. Our internal representations—or our open-eyed perceptions, for that matter—may be much more like descriptions than like pictures.¹ We do not know how images are formed or maintained in the brain; but that there are no pictures in the brain, we may be certain.

Let us say, then, that an image is an internally generated process that represents, without necessarily resembling, some state of affairs. And we can generate and manipulate images voluntarily, as my student did, to provide information about what *would* be the case if such and such were done.

IMAGES AND GOAL DIRECTION

Now let us see how useful images can be in initiating and guiding purposive behavior, in both animals and human beings.

Efference Copies

Even at the level of simple movements, images play a role in the guidance of action. What happens is this: When we act, we also imagine what the sensory consequences of action will be. This image, the *efference copy*, is normally quite unconscious, but no less important for that. Here’s an example.

When a singer holds a note, her voice actually wobbles a bit over time, above and below the pitch intended. What the singer does is make continuous

1. Pylyshyn, 1973.

A Look Forward: Constructing Plans

Before leaving this topic, we should note that we still have considered only simple cases—ones in which plans are well-learned and habitual. Obviously there are times when we must *construct* plans on the spot, to meet a new situation.

Suppose we find that the usual route home is closed. What then? We consider various possible sequences: If we turn right to Appletree Road and then left, will that get us home? Or would it be faster to go back to Ridge Street? . . . And so on. Here we move into the topic of imagining the outcomes of possible actions—modeling the world in our heads—which links the study of plans with the *theory of decision-making*. We will address it in the next chapter.

MOTIVATIONAL APPLICATIONS OF IMAGERY

We have sketched out some of the ways in which images can guide behavior in animals and humans. Now let us look at some ways in which this knowledge has been put to use.

Systematic Desensitization Therapy

First, let's look at a therapeutic technique called *systematic desensitization therapy*, often used to combat troublesome fears, or *phobias* (pp. 260–62). It applies the principles of classical conditioning (pp. 46–48), but uses an *imagined* stimulus as CS.

First, the patient with a phobia is given training at total, deep-muscle relaxation until he can relax his entire body on command. After that, there follows a series of conditioning trials on which the patient *imagines* the feared situation—an examination perhaps, or a snake, depending on what he is afraid of. The person forms a clear and vivid mental image of the feared object or situation, while maintaining a state of deep-muscle relaxation. Extensive practice at this is given. The idea is this: If one can establish relaxation as a conditioned response to the image, then the relaxation will inhibit fear and the fear will be reduced. Notice that this is a conditioning situation, with this difference: The conditioned stimulus is not in the environment but in the person's imagination.*

One therapist, for instance, has used this method to treat college students who reported intense fear of snakes. He found, first, that the method was highly successful and, second, that its success did depend on a specific condi-

*There is the further assumption, justified by the success of this method, that the relaxation response will generalize from the image of the feared object to the object itself (e.g., a real snake). One may also try to condition relaxation to actual feared situations rather than imagined ones, but, interestingly enough, it is not clear that this method works any better than the one described, done in the patient's head.

tioning procedure.¹⁰ Just learning to relax, and just getting used to thinking about snakes, did not help. The two had to be paired with each other, so that relaxation responses could become *conditioned* to the thought of snakes and thus reduce fear of them (Fig. 9-6).

Systematic desensitization is one of a number of techniques known collectively as *cognitive-behavioral therapies*. Such techniques draw ideas from both cog-

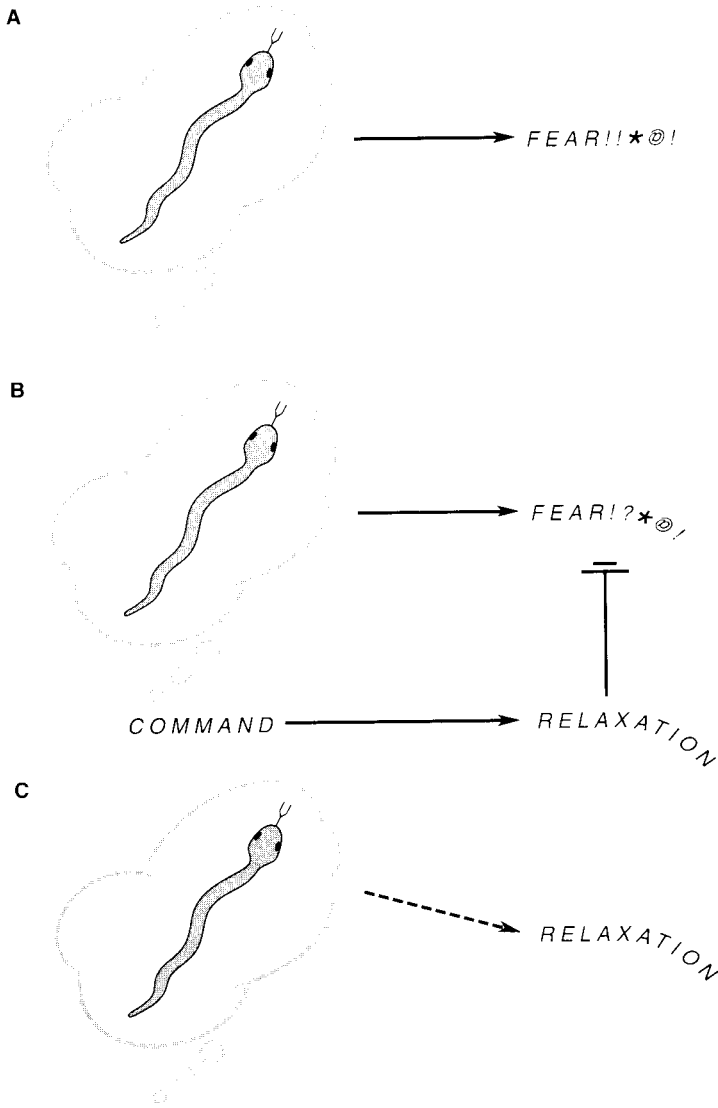


Figure 9-6 (A) In a severely phobic person, even the thought of a snake can generate fear. But (B) if the person has extended practice imagining a snake while following instructions to relax, then (1) the relaxation inhibits the fear, and (2) the relaxation comes to occur as a conditioned response to the thought of a snake.

10. Davison, 1968.

nitive and behaviorist theories, and ask each theory to give a bit of ground. It asks cognitive theorists to admit that such cognitive operations as thinking, wishing, and image formation are *responses* and provide *stimuli*, and that these follow the same laws as any other responses and stimuli—in particular, the laws of conditioning. It asks behaviorists to accept, for their part, that thoughts, wishes, and images can be important influences on behavior. This statesman-like compromise seems to be gaining popularity among clinicians.

Goal Setting

Both in the workplace¹¹ and on the playing field,¹² extensive research indicates that performance can be improved if specific *goals* are set—if, in other words, one imagines the standards of performance or attainment that are to serve as goals from now on. A survey of research has suggested some general principles:

1. Specific goals lead to better performance than vague goals. We are speculating now, but we wonder: Does *specific* mean something like *concretely imaginable*?
2. Short-term goals can facilitate the achievement of long-term goals. Perhaps (though again we're speculating) it helps if the steps toward achievement—the plans and sub-goals—are concretely imaginable.
3. Goals must be accepted if they are to affect performance. An image by itself is just an image: it must become a goal (pp. 332–34).

As so often, there is much more to it than this. As one example, it makes a difference how, and by whom, the goals are set. They may be more effective if the worker or athlete has a voice in setting them; and they should be tough, but realistic. These complexities look forward to topics such as self-determination and self-efficacy (pp. 563–64).

But even with just this much, we notice an interesting parallel: Both the behaviorist emphasis on reinforcement, and the cognitive emphasis on imagined goals, include the same advice: Be specific. In the one case, the advice is: Decide *specifically* what response is desired. In the other it is: Decide *specifically* what goal is to be attained. And in both cases, we are warned that the usual non-specific pep talk—"try harder," "do your best," "work carefully"—is likely to be resoundingly unsuccessful.

Plans in the Mind: Mental Rehearsal

"Practice makes perfect," we say—but it doesn't. We might better say that practice makes *habits*. And it turns out that imagined practice can do the same. There is now substantial evidence that practicing skills "in our head"—imag-

11. Latham and Locke, 1993.

12. LeUnes and Nation, 1989.

ining ourselves performing them—can lead to improved performance when the time comes to do them for real.

If this technique is to work, it is important that we practice, or “rehearse,” doing the task *right*. All too often, we do the exact opposite! Consider: In a few minutes we must get up before all these people and do whatever—make that free throw, give our speech, sing the song without cracking on the top F. And we worry and fret and suffer, imagining *all the ways we might do it wrong*. We are, in effect, rehearsing mistakes! It would be much better to push these thoughts of ineptitude out of our minds and, in the few minutes we have, concentrate firmly on thinking about doing the job well.

A Look Backward

In these examples, we have seen how imagined events can have many of the motivational properties of real, environmental events of the kind we’ve explored in previous chapters. Take conditioning, for example. Pair a bell (CS) with food (UCS) many times, and the bell begins to trigger salivation as a conditioned response. Well, in this section we see how the thought, of snakes for example, can be treated as a CS, and we condition a relaxation response to it (desensitization).

Or we can point to analogues of operant conditioning. Imagined outcomes, like real ones, can serve as incentives (goal-setting). Finally, just as real practice at responses or response sequences can improve our skills, so can imagined practice (mental rehearsal).

But not all images serve us as well as these. A moment ago, we mentioned the kind of troublesome thoughts that make us worry and fret and suffer. Such thoughts are a topic in their own right.



Let us try an experiment now, Reader, you and I. Your task is a simple one: Don’t think of a white bear. Easy enough. You weren’t thinking of one before, after all. So put down this book and look away and, for a minute, don’t think of a white bear.

Did you try it? How did you do? If you’re like most of us, you found the thought of a white bear returning despite your best efforts. After all, to keep the task going you had to say to yourself, “I mustn’t think of a white bear”—but if you do that, then you *are* thinking of a white bear, right?

Unwanted images—images that we wish would not come to mind, but do—are not rare, at least in this society. Sometimes the intrusion of these thoughts is only mildly annoying or even humorous. I’m having a bit of trouble right now, in fact, thinking about what I’m writing because a line of music keeps running through my head (the march from Act II of *La Boheme*, if you’re

UNWANTED IMAGES

Trouble is, a guy tries to shove it out of his head. That don’t work. What you got to do is kind of welcome it.

—JOHN STEINBECK,

The Winter of Our Discontent

curious). But the consequences are not always trivial. For one who has “quit smoking,” the *thought* of smoking may come to mind with such pesky insistence, again and again, that it becomes unbearable and leads to relapse. (Your author knows!) Persistent thoughts of a broken romance may escalate to a severe depression. In the extreme, such thoughts may be so upsetting or interfering as to be called *obsessions*, which we may think of as compulsive thoughts analogous to compulsive actions (pp. 251–53).

Now the natural thing to do, when an unwanted thought intrudes, is to try to make it go away directly by pushing it out of mind. But Daniel Wegner, who has studied this kind of thought control extensively, cautions us that such thought suppression may *not* be a good idea.¹³

Before looking at Wegner’s work, we must make a distinction. It is tempting to identify such “pushing out of mind” with Freud’s concept of *repression* (pp. 214–15). We should resist the temptation, for several reasons. First, if the notion of a white bear were repressed in Freud’s sense, this would mean that it would be pushed entirely out of consciousness, so deep that it would never come to mind spontaneously. But it does—that’s the problem! Second, Freud thought of repression as itself an unconscious mental act, so that we would not only forget about white bears, but also forget that we had forgotten about them. Clearly that is not so. And third, there is some dispute about whether Freudian repression really occurs at all. But that we push thoughts out of mind—surely there is no dispute about that. So we use the term *suppression* to distinguish what we are talking about now from *repression* in the Freudian sense.

The White-Bear Experiments

But how do we study the process of thought suppression? Wegner and his colleagues approached the problem quite directly: Set up an unwanted thought to be suppressed, and see what happens to it.

In one experiment, each subject was isolated in a laboratory room, with a microphone and a button which, when pushed, rang a bell. For the first 5 minutes, the person was asked to speak into the microphone whatever thoughts came to mind—something like Freud’s free association. Then, the person was asked to talk aloud as before, but *not* to think of a white bear. If the thought came to mind anyway, the person was to ring the bell and go on. Finally, the subjects were told that it was now okay to think about white bears, but to continue ringing the bell each time they did.

Of course, not to think of white bears proved a difficult task. Here is part of one subject’s transcript (each asterisk shows a bell ring):

Of course now the only thing I’m going to think about is a white bear. Okay, I mean it’s hard to think that I can see a bell* . . . and don’t think about a white bear. Ummm. what was I thinking of before? See, if I think about flowers a lot* . . . I’ll

13. Wegner, 1989, 1992.

think about a white bear, it's impossible.* I could ring this bell over and over* and over* and over* and . . . a white bear* . . . and okay . . . so, my fingernails are really bad, they . . . need to be painted because they . . . they're chipping at the ends . . . it's like I have to force myself to not think* about the white bear. So, I also have this little brown freckle on my finger and I also have little sparklies* all over my hands and neck from Halloween last night 'cause we got all dressed up. . . . And I'm trying to think of a million things to make me think about everything* but a white bear and I keep thinking of it over* and over* and over* and over. So . . . ummm, hey, look at this brown wall . . . I'm upset but . . . because (pause) but all I think about is white bear.*

In fact, though, subjects did have some success at thought suppression. They did ring the bell less than control subjects, who were told just to go ahead and think about white bears (Fig. 9-7). More interesting was what happened after the prohibition was lifted and the subjects were free to think about white bears. The thought showed a "rebound;" they actually thought about white bears *more often* than subjects who were free to think about them from the outset. Indeed, they appeared to think about such creatures more and more, not less and less, as time went by.

This rebound has been demonstrated many times; but why does it occur? One's first thought is again a Freudian one: The forbidden thought, denied access to consciousness, gathered more and more energy and pushed for expression all the harder, and so whooshed out in a rush when permitted to do so. Wegner takes a different view, a cognitive rather than a psychodynamic one. He sees it not as a matter of energy, but of *association*.

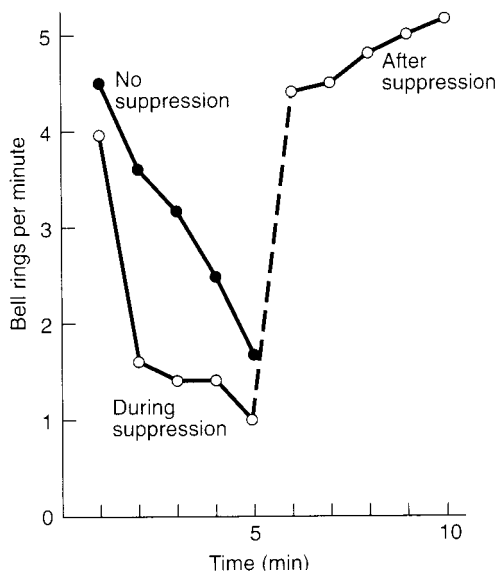


Figure 9-7 The white-bear experiment. Subjects succeed in suppressing white-bear thoughts ("suppression"), as compared with control subjects who are allowed to think about white bears ("no suppression"). But notice the lasting increase in white bear thoughts after the instructions to suppress are removed ("after suppression"). (Redrawn from Wegner, Schneider, Carter, and White, 1987.)

To see why, let us look more closely. What we have in this situation is—again!—our old friend the negative-feedback loop. When the forbidden thought is detected (input), some system is called into play (output) to make the unwanted thought go away (negative feedback). So we need an input device to detect the forbidden thought, and an output device to get rid of it.

Suppose then that the subject splits his mind, so to speak, into two parts, which we may call the “lookout” (to detect the thought) and the “bouncer” (to send it away). The bouncer does the actual pushing out when the forbidden thought occurs; at other times, the bouncer can relax. But the lookout must detect the forbidden thought whenever it does occur, so as to summon the bouncer; and so the lookout must be vigilant *all the time*, ever watchful for an appearance of the dreaded white-bear image.

But to be vigilant is to know what one is watching for—one has a kind of internal *search image* that represents the forbidden thought. The lookout must be forever asking, “Has a white-bear thought appeared?”—and that, of course, *is* a white-bear thought. In a word: If one is actively suppressing the thought of a white bear, one is only keeping it from the front of one’s mind. In the back of one’s mind (Freud’s preconscious), where the lookout is posted, the thought is there all the time—precisely *because* the lookout must watch for it in order to suppress it.

What about the bouncer? To move the thought out of the focus of consciousness, he replaces the thought with something else—e.g., the chipped fingernails, the Halloween costume, the brown wall. But, because the white bear is always prowling in the back of the mind, each of these “distractors” can become *associated with* the white-bear image. Each becomes, so to speak, a reminder of white bears. So, when the ban is lifted, the subject may think of the costume and be reminded of the bear, see the fingernails and be reminded of the bear, see the brown wall and be reminded of the bear, . . . No wonder the bear comes so often to mind!

But how can we test this idea? It has been tested in many ways, but let’s look at two examples.

First, think again about the lookout. That part of the mind, we said, must be on the alert for white bears all the time. If we increase the amount of work the mind must do, then less cognitive capacity (or psychic energy?) should be available to the lookout, and suppression should fail more often. This happens. In one study, subjects were asked either to suppress or not to suppress a particular word (e.g., *house*) while performing some other task as well. If they performed that second task under time pressure (increasing the cognitive load), then the unwanted word popped into mind more often than if time pressure was absent (Fig. 9-8).¹⁴ So, if the “backs of our minds” are kept busy with something else, they can’t be as vigilant about white bears!

What about the bouncer? The argument, again, is: (1) If the bear image does come to mind, the bouncer boots it out by replacing it with other

14. Wegner and Erber, 1992.

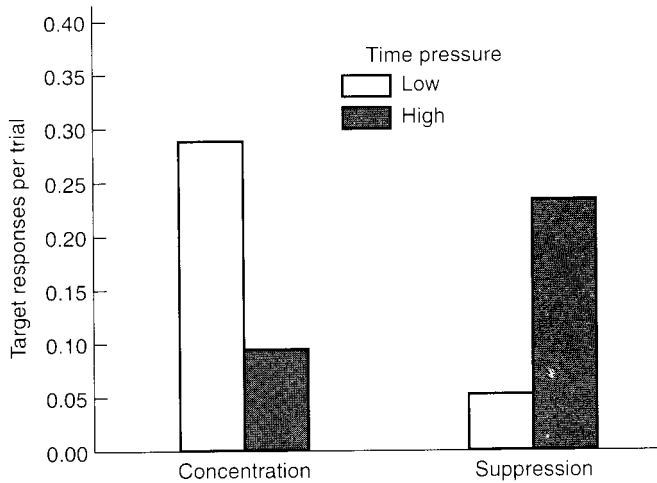


Figure 9-8 Left bars: In subjects concentrating on a class of target words, high cognitive load (high time pressure) interfered with concentration. However (right bars) in subjects trying to *suppress* the thought of those words, high cognitive load interfered with the suppression! (From Wegner and Erber, 1992.)

thoughts; but (2) such “other thoughts” will then become associated with white bears; and (3) the other thoughts are usually drawn from stimuli in the immediate environment (e.g., a brown wall). It follows that such a simple matter as *moving to a different room*, before the last phase of the experiment, should reduce the rebound that otherwise occurs then. And it does. Notice that the Freudian theory of rebound—a buildup of pressure behind the white-bear image itself—does not predict this result and cannot easily explain it.

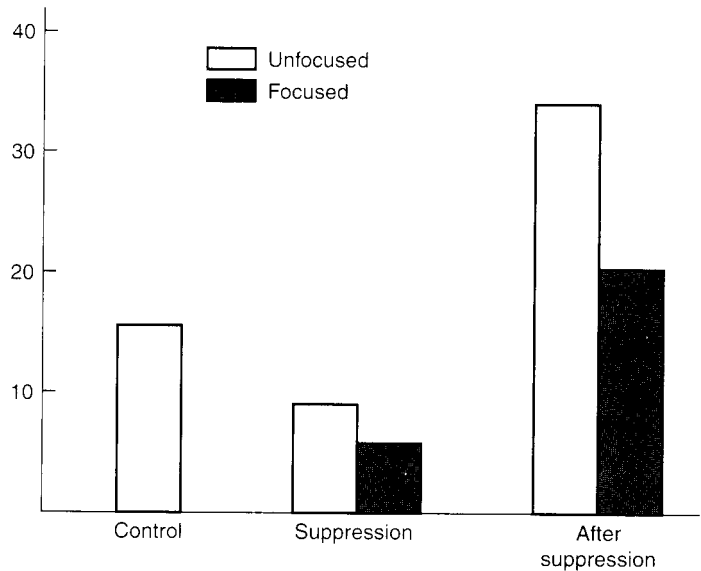
The Red-Sports-Car Experiment

The idea can be tested in another way. The suggestion, again, is that rebound occurs because a variety of irrelevant cues (fingernails, brown walls) are now associated with white bears—because subjects switch now to one, now to another, such cue when the bear comes to mind. If so, then we ought to be able to reduce the rebound if only *one* irrelevant idea is substituted for the bear image. To test this idea, the original white-bear experiment was repeated, but with a difference. In one condition, the subjects were asked not to think about white bears as before. In another condition they were told that if the white bear did come to mind, they should switch their mental focus to the image of a red sports car.

Focus on the red sports car did not much affect the frequency of white-bear thoughts while subjects were suppressing (Fig. 9-9, middle bars). But it did greatly reduce the rebound increase in white-bear thoughts after the period of suppression (Fig. 9-9, right-hand bars). Presumably, by focusing on a red sports car and nothing else, these subjects were prevented from linking the white-bear idea to a variety of cues.

There may be some everyday parallels to this finding. “Items that children seek for [security] [such as “security blankets”] could have the same palliative influence we found with the [red sports car]. . . . Some people report . . . that

Figure 9-9 The red sports car experiment. See text for explanation. (Data from Wegner, Schneider, et al., 1987.)



when they have an unwanted thought, they pray or think of God. This . . . like turning to thoughts of a [red sports car], may produce long-term advantages in the avoidance of the unwanted thought.”¹⁵

Secrets

Wegner has extended these ideas to another domain that at first looks quite different, but turns out not to be—the domain of keeping secrets.

If the white bear is a *thought* to be suppressed, a *secret* is *speech* to be suppressed. Someone tells us something interesting, X, but also says, “Now, that’s a secret. You mustn’t tell anyone else—especially Waldo!”

What should happen? We now give the lookout an assignment: “Are we about to speak of X? If so, we must inhibit that act—especially if Waldo is around!” But then the thought that we *might* say X will be always in the back of our minds, especially in Waldo’s presence. And that thought will become associated with all the features of each situation in which it occurs—especially Waldo’s presence! The very act of suppressing that speech increases the danger that it might pop out accidentally.

Let us see what havoc this could play. Suppose Mary has a relationship with Harry. Suppose it must be kept secret, for whatever reason—maybe she has a spouse, Barry, who would not be pleased about it. So she must be constantly on guard against speaking of her relationship with Harry—which means that Harry will be ever in the back of her mind, triggering the lookout.

15. Wegner, 1987, p. 69.

Now suppose Mary takes one further step: Realizing that Harry is always in the back of her mind, she draws a conclusion from this. She says to herself, "Gosh, I find that Harry comes to mind over and over again. I want to tell everyone about him—but of course I can't. But I keep thinking about him all the time. You know . . . I must be just wild about Harry!" She may, in a word, conclude that she's madly in love with Harry, because he's on her mind all the time—when in fact he is on her mind all the time only because he must be kept secret.* Without the secrecy, Mary might not be much interested in Harry at all. Indeed, she might even see that he's kind of a Jerk (p. 356). Wegner calls this sort of thing a "synthetic obsession."

In the extreme case, Mary might divorce Barry and marry Harry. And *then*, now that he isn't a secret any more, she may find that she seldom gives him a thought. She may even recognize his jerkhood now, as she didn't before. The result could well be that Mary, Barry, *and* Harry are all less happy than before—and all because of a "mustn't tell." One wonders how often it happens.

Does all this sound farfetched? It turns out that at least a mild case of it can actually be created experimentally. In one study, mixed-sex couples (assigned so that the partners were strangers to each other) competed in a card game with other couples.¹⁶ These experimental couples were asked to "engage in non-verbal communication with their feet and ankles under the table,"¹⁷ that is, to play "footsie." But in one condition, the game of footsie was kept a secret; in the other, it was not. Just that much was enough to make a difference! At the end of the game, the secret-footsie players reported themselves more attracted to each other than did non-secret players or couples who did not play footsie at all. Secrecy itself, in other words, enhanced how attracted the subjects felt toward each other—even after only a very brief acquaintance with, shall we say, minimal contact.

A Look Backward

Looking back over these ideas, what advice can we give a person who is in the grip of recurrent unwanted thoughts? Let us suppose a romance has broken up. Harry is obsessed and depressed about his lost one, and painful thoughts of his loss well up again and again. In part, that's because Mary is embedded in a rich and dense network of *associations*. Mention of a coastal town where the two spent a weekend, sight of the telephone on which he used to chat with her, hearing a word that they used as a private joke—any of these may bring all the memories crashing back. If the relationship was secret, it might be that the

*This may sound very strange. Can't Mary just look inside herself and *see* whether she's in love with Harry or not? There are complications here (pp. 484–88), but the short answer is: Not necessarily. We do draw conclusions about our own mental states from observing our own behavior, just as we draw conclusions about others' minds from observing theirs (Bem, 1967).

16. Wegner, Lane, and Dimitri. 1992.

17. Wegner. 1992, p. 198.

obsession is so haunting in part *because* it was secret (a synthetic obsession). But that's little comfort to Harry now.

If Wegner is right, one thing we can say is: To suppress the thought directly, replacing it with whatever comes to mind each time, is not a good idea. It will likely prolong the sadness, (1) by keeping Mary around in the back of Harry's mind, because the lookout must look out for her continuously, and (2) by adding still more everyday cues that now become associated with Mary, because the bouncer switches to each of them in turn when she does come to mind.

Instead, Harry might try the red-sports-car technique: Fix on some *one* distracting thought, and think of that every time Mary comes to mind. One trouble is that Harry may find it unpleasant to treat such warm memories in such a mechanical way. And that may be just as well. As Wegner says, "We can become mean and heartless" if thoughts of another person are flipped out of mind like empty soda cans—even (especially?) if the flipping is effective.¹⁸

In the end, the best thing for Harry to do might be to "kind of welcome it," in Steinbeck's words: to go ahead and think about Mary when she comes to mind. Eventually there will be a certain habituation (pp. 239–41) which will reduce the sadness of the thoughts. (Time heals, we say, and perhaps that is how it does it.) Meanwhile, it will hurt, that's true; but the alternatives might hurt even more, as we have seen. And even the pain is not all bad. If Harry can feel that strongly about another human being, well, perhaps it can please him to know that.

One final point. At the end of the last section, we spoke of pushing out of mind our worries about how we might do something poorly, and focusing instead on rehearsing doing it well. Are we now taking back that advice?

Not really, for there is a difference. We mentally rehearse a good performance in the few minutes we have, and then we go out and make the free throw, or give an eloquent speech, or sing the song well. After that, we may indeed have rebound thoughts of how we *might have* messed up; but so what? It's over and we didn't mess up, and that's what counts. In short, active thought suppression might be very good for getting troublesome thoughts out of our way until a job is done. It is over the long term, as a way of dealing with *recurring* unwanted thoughts, that it is likely to boomerang.

SCHEMAS

Earlier, we mentioned that an image need not be a picture in the head. Indeed, we can go further: We use inner representations of events or things, or classes of such, that *could not* be as specific as that.

18. Wegner, 1987, p. 74.

For example, we know what a cat is. Seeing some animal for the first time, we have no trouble deciding whether it is or is not a cat. Do we do this by checking it against a "picture" of a cat in our heads? We couldn't—because no such picture could match both a white cat *and* a black cat. But we can easily judge the catness/non-catness of either a black or a white candidate.

Our knowledge of what a cat is, therefore, must leave many details (like color) unspecified. An abstract bit of knowledge of this sort is called a *schema*.

Plans, too, can be schematic rather than specific. Consider how someone can say, "Let's go eat!" We may agree to the suggestion even before we decide just what to eat or where. We have no specific images in mind, but only the abstract framework: Somewhere or other, we shall seek something or other to eat. The details are unspecified.¹⁹

Let us look more closely.

Schemas and Movements

Consider a basketball player taking a shot. He can throw the ball at the basket from any of an indefinite number of positions on the court; and each position requires a different set of movements if the shot is to succeed. The farther the player is from the basket, the harder he must throw the ball, and the more arch—angle of the toss relative to the floor—he must put into the throw.

Now a very experienced player *could*, perhaps, learn the specific throwing movements to be associated with each possible position on the court. But that obviously would entail a very long period of training and a formidable load on memory. It would be more efficient for the player to learn a set of *relationships*—for example, ones that specified the relation between distance from the basket and (1) the force and (2) the amount of arch, required for success. Knowing those relationships, and knowing one's distance from the basket right now, one could *compute* the needed force and angle and, in turn, establish these as goals for the muscle-control systems lower in the hierarchy. The internal representations of these relationships would constitute the schemas that in turn make up the higher-order motor schema, "skill at sinking baskets."

That one may learn such relations has been shown many times.²⁰ In one experiment, children practiced tossing bean bags at a target with their eyes closed. Some children practiced at a distance of 3 feet from the target. Another group of children practiced sometimes at 2 feet and sometimes at 4 feet away. Then on test trials, everybody threw from 3 feet away. Of the two groups, the variable-practice group performed more accurately, even though they had had *no* practice at throwing from that distance before!

How could they do so well at a task they hadn't practiced? The practice they did obtain, at throwing from a variable distance, must have allowed them to learn the *relation* between distance from the target and the kind of tossing

19. Mook, 1990.

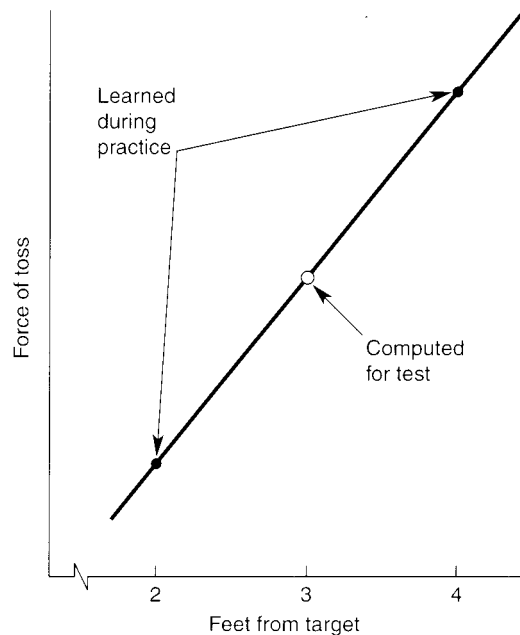
20. For review see Mazur, 1994.

movements required to hit it. It is as if they had learned an equation—the schema—which related distance from the target to the required force of the toss, for example. Then, for the new distance, they solved the equation to compute the force required now (Fig. 9-10). Or if they did not do exactly that, they did something that had the same effect. And they did it on the spot, rapidly, and quite unconsciously—the odds are that the kids could not have told us, if asked, just how they had accomplished this feat.

If all this seems like an impossibly difficult cognitive achievement, be assured that feats of computation as difficult, or more, can be accomplished by much smaller brains than ours. Honey bees, for example, can navigate by taking their bearings from the sun. Having found a food source and returned to the hive, the bee can find the food again by flying off at the appropriate angle relative to the sun. This means that at minimum, the bee must note the sun's angle (so many degrees to my left) on the homeward flight, and from it compute the appropriate angle (so many degrees to my right) for the outward flight. (The bee does not fly home backward!)

But the navigational achievement is even more remarkable than this. The sun's position in the sky (as seen by an earthling) changes over time. What if time goes by between coming home and flying out again—and if during that time the bee is inside the hive, in darkness? (If this does not happen spontaneously, an experimenter can make it happen.) What happens is that the bee *corrects* the angle for its departure, so that it is appropriate to the sun's new position given the time that has elapsed.

Figure 9-10 Practice at throwing from 2 feet and from 4 feet enables a child to learn the relation between distance and force required. The necessary force for 3 feet can then be calculated.



Of course the bee does not literally solve equations the way you or I would—we give it no pencil and paper, and it has not had the math prerequisites—but something happens in the brain of the bee that has the same effect. And when we consider that the entire bee is substantially smaller than the brain of a rat, much less a human, we must be impressed yet again with how much Nature can do with how (relatively) little.

Higher-Order Schemas: Lattice Hierarchies Revisited

Schemas, including how-to schemas or plans, may exist at various levels. For example, as members of this society, we have a sandwich-making schema; that is, we know how to make a sandwich (a cheese sandwich, a roast-beef sandwich, or whatever). That schema breaks down into lower-order ones (plans) that set specific goals and fill in the details: Find the bread and extract two slices of it; find the spread and spread it on the bread; find whatever-it-is to put in the middle; find the lettuce—cancel; this is to be a grilled-cheese sandwich, so no lettuce—and so on.

But we could do all these things for any of a number of reasons. We may of course “run” the sandwich-making schema in response to our own hunger. Or, suppose a Significant Other calls to us, “Would you make me a sandwich, please?” Then we may run the same schema as a sub-unit within a quite different higher-order schema, one that says, “Be nice (within reason) to Significant Others.” Or if we are restaurant workers, again we make the sandwich, but this time within a “doing our job” schema, which may in turn be part of a “breadwinner” schema, and so on. We have our familiar lattice hierarchy (Fig. 9-11).

Even with just this much, there is room for a formidable degree of complexity. Consider this scenario:

The breadwinner comes home, tired from a hard day at the office. She calls to her spouse, “Honey, would you make me a sandwich, please?” But the spouse is tired too, from cleaning and feeding the baby and changing diapers and shopping and preparing dinner. . . . What shall he do?

Well, the sandwich-making schema is a sub-routine within the “Be nice . . .” schema, and also, perhaps, within the “homemaker’s duties” schema. For these and other reasons, the husband may say “Sure,” and do it. But all this may clash with another schema, “Chores should be divided equally between spouses,” which in turn is nested within “People should treat each other equitably.” If that pathway is the more available one right now, the spouse could well react with “Hey, make your own sandwich!” with escalation a distinct possibility.

Interviews with American homemakers (all female in this case) show that they can feel pulled both ways by just such conflicting schemas:

There have been times when I felt it was very unfair . . . Before we got our washer and dryer we had so many arguments over the laundromat . . . Because he didn’t

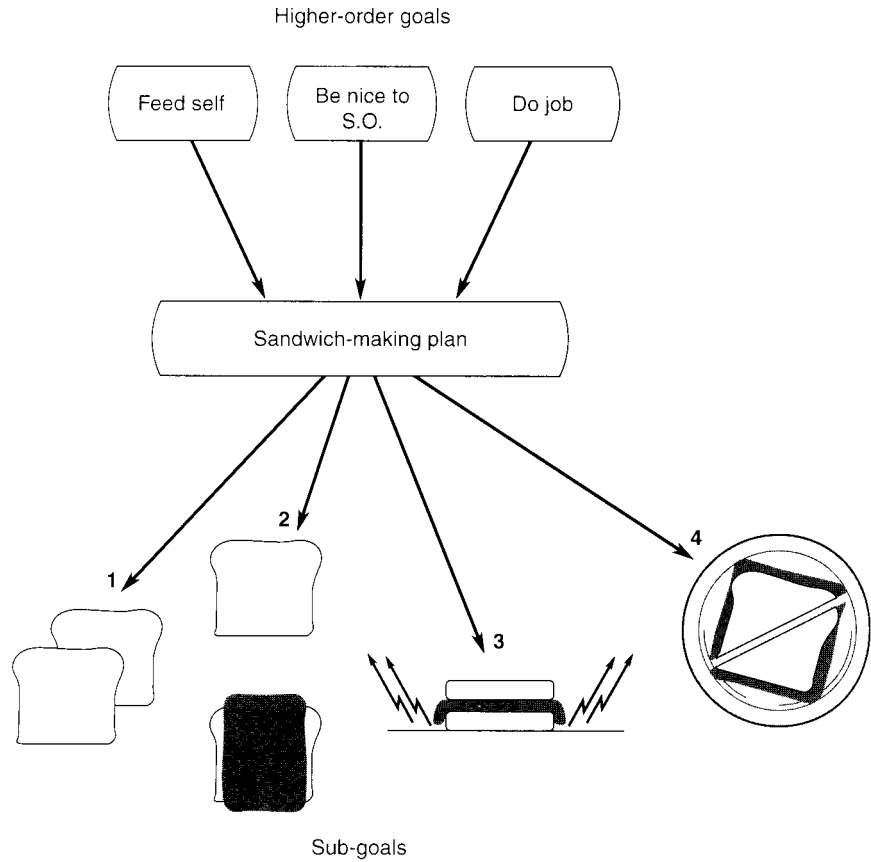


Figure 9-11 The sandwich-making plan may be called into play by different higher-order goals on different occasions.

want to go do laundry with me . . . [So] I left his laundry and I took mine. I said, "You wash your own. If you can't go with me to help me do it then you can wash your own." And that changed right away.²¹

But on another occasion, the same woman said:

But I do it because I know if I don't do it, it won't get done. . . .²² And somebody at work's going to say, "God, his wife must not care about his clothes." Because people naturally assume that the wife does these things. . . . I just don't want them to think I'm not doing what I should. Again it's doing my wifely duties.²³

One other point. Did you notice, Dear Reader, how the crafty author introduced a half-twist into the sandwich-making scenario? Did you do a men-

21. Quinn, 1992, p. 96.

22. *Ibid.*, p. 97.

23. *Ibid.*, p. 100.

tal double take while reading it? We will return to such matters when we talk about default values and schema-driven inference (pp. 409–11).

Scripts and Players

Our schemas extend beyond actions and things or classes of things, to events, sequences, and characters. Schemas that sketch out sequences of events are sometimes called *scripts*.²⁴ For example, suppose we have decided to go to a restaurant to eat. We have a schema—a restaurant script—that tells us, in general, what to expect. We will enter, order food, eat it, pay for it, and then leave. Details are unspecified; we might pay the waiter or waitress, or a cashier; but the general sequence of events is blocked out in our minds in advance.

And scripts are performed, or otherwise acted out, by *players* that we can identify using Player schemas. Thus in the restaurant script, we know that we might encounter either a Waiter or a Waitress, though possibly neither (it might be a cafeteria), and perhaps, but not necessarily, a Host or Hostess. Of course we can readily identify a player who plays a more specific role—the Surly Waiter, for example—just as we can identify the Bad Guy in a Western movie. And we know how to deal with surly waiters (speak firmly and skimp on the tip), just as we know that a Bad Guy, somehow or other, will get his comeuppance in the end. Many of our stereotypes or slang terms identify Players: the Bookworm, the Sexpot, the Male Chauvinist, the Man-hater, the Crusty Old Country Doctor. . . .

Or: Suppose we meet a professor we have never encountered before. Still, we know a great deal about her, because we know about professors and she is cast in the Professor role (Fig. 9.12). She will probably lecture or lead discussions, suggest readings, and turn in some evaluation of students' performances at term's end. She will probably not write us a speeding ticket, or jump up on a table and sing *Melancholy Baby*. In short, we know quite a lot about a professor before we observe anything about her. The Professor schema gives us that information.

Scripts and players, like other schemas, may have the familiar hierarchical organization. This stranger we've just met clicks into the schema Professor, and also the schema Woman; and both of these are components of the schema Person. There are more restricted sub-schemas in turn: if someone tells us, "Professor Bunzoff teaches a really stiff course," that triggers the Hard Professor schema, and tells us a great deal right there.

But let's look at an actual Script with real Players. Anthropologist Dorothy Holland followed the college careers of a number of women, with particular attention to their adventures within romantic relationships.²⁵ Her data suggested that there was in fact an identifiable Script that such relationships followed. In the case of heterosexual relationships, we have a Guy and a Girl (the Players). The script goes like this (as seen by the Girl):

24. Shank and Abelson, 1977.

25. Holland, 1992.



Figure 9-12 By classifying persons or events—that is, by assimilating them to schemas—we make available our prior knowledge about persons or events of that kind.

1. The Guy and the Girl are drawn to one another.
2. The Guy learns and appreciates the Girl's unique qualities.
3. Sensitive to her desires, the Guy shows his affection by treating her well; for example, he takes her places she likes and shows that he appreciates her uniqueness as a person.
4. She in turn shows her affection and interest and allows the relationship to become more intimate.

The motives and rewards also are schematized. The relationship provides the rewards of intimacy, and it validates the attractiveness of both Girl and Guy.

Since the details are unspecified, this Script leaves room for ad-libs. For example, if the Guy's attractiveness or prestige is lower than the Girl's, he compensates by treating her especially well.

But even with a well-crafted script, performances do not all run smoothly. Some actors flub their lines, or simply can't handle their parts. Consider the female who is so unfortunate as to meet up with a Jerk—or the unfortunate male who is one. A Jerk is

a type who is neither attractive *nor* sensitive to women. He cannot compensate for his low prestige by treating the women especially well. He's too stupid or too "out of it" to discern her special qualities and anticipate her desires. . . . He may be so insensitive, in fact, that he cannot even tell that she dislikes him. Because he cannot "take the hint," he will not leave her alone and thus he becomes more and more irritating as time goes by.²⁶

26. Holland, 1992, p. 66.

Now this description of the Jerk comes from interview data with women at two colleges in the American South. But at a third college on the East Coast, the present author has replicated parts of Holland's study, and finds the Jerk a sadly familiar player at that institution too. Indeed, my informants are divided as to whether a Jerk is even worse than a Creep. But he's pretty bad, either way.

Schema-Driven Affect

Jerks are unpleasant to deal with—they can't help it, but neither can we. We don't like them. Schemas, then, may call forth emotion or *affect*, in which case we speak of *schema-driven affect*.*

If we are told that Harry is a jerk, we may dislike Harry before we have even met him; the schema ("He's a jerk") drives the affect ("I don't/won't like him").

Such things as accidental resemblance can bring a schema to mind, triggering its emotional component. We may take an instant dislike to a professor because she reminds us of old Miss Phacemask whom we so hated in the second grade. A trivial matter, do we say? President Harry S Truman, who was not usually the most trusting of men, placed a great deal of trust in the leader of the Soviet Union, Josef Stalin. His private correspondence tells us why: Stalin reminded Truman of a man who had befriended Truman when he was younger! Stalin's appearance triggered the schema for the old friend, and its affective component—"trustworthy"—was then applied to the Russian dictator.²⁷

Attitudes, Values, and World Views

Schemas can be even broader than in these examples, and they can be linked together in even more complex networks. Indeed, the schema concept may help us understand how specific actions make contact with the attitudes and values that characterize both individuals and cultures.²⁸

Among orthodox Hindus in India, for example, it is taboo for a widow to eat fish. We can suppose that such a widow has a fish-eating schema—she knows how to eat fish—and that this schema is a member of a higher-order schema, "ways of feeding oneself." But now her status as a widow places that plan within another abstract schema, "actions that are forbidden." So the plan will be inhibited and not expressed.

For people raised in American society, it may be hard to realize just how strong the taboo can be. Part of what makes it so strong is that the "taboo" schema links this action with very many others, to generate a dense and emo-

*Fiske, 1982. The term *affect* (a noun when used this way; accent on the first syllable) refers to emotions or feeling states, as of pleasure or displeasure.

27. May, 1973.

28. D'Andrade and Strauss, 1992.

tion-laden network of associations. It is instructive to compare the answers of Americans and Indians to a series of questions about that taboo, asked by a team of anthropologists, Richard Shweder and his colleagues.²⁹ First, an American respondent:

- Q. Is the widow's behavior wrong? A: No. She can eat fish if she wants to.
 Q. Is it a sin? A: No.
 Q. What if no one knew this had been done? Would it be wrong then? A: It is not wrong in private or public.
 Q. Would it be best if everyone in the world followed the rule that it is all right for a widow to eat fish? A: Yes. People should be free to eat fish if they want to. Everyone has that right.
 Q. In India, it is considered wrong for a widow to eat fish. Would India be a better place if it was considered all right for a widow to eat fish if she wants to? A: Yes. That may be their custom but she should be free to decide if she wants to follow it.
 Q. What if most people in the United States wanted to change the rule so that it would be considered wrong for a widow to eat fish? Would it be okay to change it? A: No. You can't order people not to eat fish. They have a right to eat it if they want.
 Q. Do you think a widow who eats fish should be stopped from doing that or punished in some way? A: No!

For a typical Indian respondent, the dialogue might go like this:

- Q. Is the widow's behavior wrong? A: Yes. Widows should not eat fish, meat, onions or garlic, or any "hot" foods.
 Q. Is it a sin? A: Yes, a great sin. She will suffer greatly if she eats fish.
 Q. What if no one knew this had been done? Would it be wrong then? A: What difference does it make? It is wrong. A widow should spend her time seeking salvation—seeking to be united with the soul of her husband. Hot foods will distract her. They will stimulate her sexual appetite. She will lose her sanctity. She will want sex and behave like a whore.
 Q. Would it be best if everyone in the world followed the rule that widows should not eat fish? A: That would be best. A widow's devotion is to her deceased husband—who should be treated like a god. She will offend his spirit if she eats fish.
 Q. In the United States, widows eat fish all the time. Would the United States be a better place if widows stopped eating fish? A: Definitely, it would be a better place. Perhaps American widows would stop having sex and marrying other men.

29. Shweder, Mahapatra, and Miller, 1990; adapted here.

- Q. What if most people in India wanted to change the rule so that it would be considered all right for widows to eat fish. Would it be okay to change the rule? A: No. It is wrong for a widow to eat fish. Hindu dharma—truth—forbids it.
- Q. Do you think a widow who eats fish should be stopped from doing that or punished in some way? A: She should be stopped. But the sin will live with her and she will suffer for it.

Looking over these dialogues, we see at once that we are dealing with larger issues than fish-eating here. The Hindu schema network links eating fish with sexual matters, the nature of marital obligations (e.g., toward the husband's spirit), the nature of the marital relationship itself (see below)—and much besides. One schema is linked closely with many others, both within and across levels.

For an American, many misfortunes “just happen.” They are seen as matters of chance. For the Hindu, events are caused and the universe is just.³⁰ A misfortune (such as becoming a widow) is a punishment for sin—if not in this life, then in a previous one—and a chance to expiate it. And sins will be punished (the widow will suffer greatly if she eats fish), again in another life if not in this one.

Look again. At first glance, another fundamental difference in outlook between the two cultures seems to be this: The American sees the taboo as a matter of *social convention*—a widow's eating fish is considered wrong because a society calls it wrong. It would be okay, nay better, for society to change that rule. To the Hindu, for a widow to eat fish *is* wrong, and that is a *fact*—no matter what any society says. Would it be okay for society to change the rule? No. For a society to call it right would not make it right, any more than we can make a circle a square by calling it one.*

But if we look more closely, we see that the difference is more subtle than that. Some Americans, too, insist that certain actions are wrong *in fact*, whatever society's rules may be; some object to abortion on such grounds, for example. And even in the above dialogues, the American answers imply that certain moral rules hold as matters of fact, though these are unstated because they are taken for granted. It is assumed that individuals have a “natural right” to do as they please, provided they treat others fairly and do not hurt them. And this “right” articulates with the American marriage-and-family schema. Marriage is something like a contract: Two people freely enter into a relationship between equals, retaining their “natural rights” as individuals.

For Hindus, the taken-for-granted moral principles do not center around the *rights* that individuals possess, but around the *obligations* that fall on them as members of a group. Now in fact, that kind of schema is not unfamiliar to

30. Shweder, 1991.

*A legislative body in the United States, not so long ago, solemnly passed a bill fixing the value of *pi* at 3.0.

Americans. Shweder et al. suggest this interesting analogy: Compare the Hindu marriage not to a contract between equals, but to a military organization.*

Most Hindu marriages are arranged by the parents, just as a soldier may be drafted into the military with little to say about it. As a soldier he has obligations to his group; and these, whether he likes it or not, take precedence over his individual rights—just as a Hindu wife's obligations to her husband (even to his departed spirit) supersede her own likes and dislikes. Punishment for shirking one's obligations may be very severe. If a Hindu woman leaves the house without her husband's permission, he may think it quite proper to beat her—just as a soldier who leaves his base without his superior's permission risks a very unpleasant experience. Finally, the relationship between soldier and officer is *not* a relationship between equals—far from it! Each has obligations to the other, as do a Hindu wife and husband. But in both cases, who gives the orders, and who takes them, is not in question.

That explanation may not lead my Western readers to *like* the Hindu outlook any better, but it may convince them that it is not bizarre or unintelligible. It's a matter of what model, or metaphor, or schema, one applies to marriage: is it like a contract, or like a soldier's duties? It makes a great difference.

All that, from a "simple" taboo against widows' eating fish? Yes; that is the point. As we trace lines of association and embeddedness, we find the taboo embedded in a rich and dense network that takes us to very abstract and general schemas indeed. These are schemas that specify attitudes, values, even world views: the nature of morality and of the soul, what a family is, even what it means to be a person within a society.

Looks Backward and Forward: Schemas and Motives

Let us review what we have learned about schemas, and let's also see more explicitly how they may have *motivational* properties.

Schemas are structures of general knowledge—knowledge about *kinds* of events, persons, and things. Our professor schema tells us something about professors—not just this or that professor, but professors in general. Similarly for restaurants in general, Jerks in general, generals in general, and so on. Schematic knowledge would also include our knowledge of how to make a sandwich or change a tire (any tire), and of the relation between (say) distance from a target and force required to hit it, so that from any particular distance we can estimate the force we need to apply. And it would include, if we are orthodox Hindus, our knowledge that it is wrong for a widow to eat fish—not this or that widow, but widows in general.

But how do schemas take on motivational properties? How do they affect not just what we know or believe, but what we do?

*Shweder et al. draw this analogy only in passing; the present elaboration of it is my own, and it is my fault if I misunderstand it.

It obviously is not automatic. You and I may know how to make a sandwich, without being inclined to make one right now. A group of American workers agreed that, in general, "getting ahead" is a good thing. The decisions they actually made, however, had little to do with "getting ahead"—they might actually work against this—but they did fit the schema, "being a good breadwinner."³¹ Some schemas, in other words, are more closely coupled to action than others.

But how are they coupled to action at all? Well, some schemas specify consequences—analogue to reinforcers and punishers—directly: This is what will happen if we do such and such.³² "A sandwich would taste good right now." "My friends and/or in-laws will look down on me if I let my husband's clothes go unwashed." "The widow will suffer if she eats fish, in this life or a later one." In all these cases, the imagined consequence is affectively or emotionally charged (schema-driven affect): "W'ouldn't that be [nice or awful]!"

Actions also can be linked not to consequences, but to other emotionally laden schemas. One may believe in general that *fairness* is a good thing. Then, moving from that general schema to the specific instance, we may get to "It's unfair for her to ask me to make her a sandwich on top of everything else," and thence down to the specific plan, "Here's how to refuse"—and doing it! Or, a belief such as "Good spouses accept certain duties" may be in control at the moment; and by way of "Sandwich-making is one such duty," we could work down to activation of the sandwich-making plan. Here we look forward to the relation between motivation and cognition (Chap. 11) and between motivation and emotion (Chap. 12).

All this aside, cognitive theories of motivation point to a close interaction between *motives* and *beliefs* in determining action—and schemas are important determinants of beliefs. If we ask our motivational question, "Why did he do that?" a cognitivist's reply will often be of this sort: "He did X because he believed Y. And why did he believe Y? Because . . ." and the schema concept will figure in the explanation that follows. All this will be clearer after we have had a look at *decision theory* (Chap. 10).

Thus, schemas can affect action in ways we might consider not motivational, but cognitive—but this is a difficult line to draw (Chap. 11). For example: Do we believe that we are competent at handling romantic relationships? Whether we seek such relationships can depend on the answer.³³ This looks forward to such issues as self-efficacy (pp. 563–64) and helplessness (pp. 564–65). Or: what alternatives do we consider when deciding what action to take? Do we consider alternatives at all? If we believe that some one action is necessary or inevitable or both, we may "just do it" without consideration. That looks forward to such topics as the framing of decisions (pp. 395–97).

31. Strauss, 1992.

32. D'Andrade, 1992.

33. Holland, 1992.

All told, the schema concept is a busy interface among three broad domains of psychological inquiry: motivation, cognition, and action. We shall meet it again many times.

SUMMARY

The basic question of purposive behavior is: How can we get the future into the present? The cognitive answer is: We represent, or imagine, the future state now. An image can be thought of as an internal process that represents, without necessarily resembling, some state of affairs.

Images can guide goal-directed behavior in a number of ways. Actions can be corrected by correcting a mismatch between the actual effect of the action and its intended, or imagined, effect; the imagined effect is sometimes called an *effERENCE COPY*. Or one can imagine an object that is (or could be) located in the environment, even though it is not there to be perceived now. *Cognitive maps* specify *where* it is. *Search images* specify *what* it is. The literature shows overwhelmingly that even sub-human animals are capable of such cognitive feats; this literature includes the work on response-reinforcer expectancies, described in the previous chapter.

Plans are organized, hierarchical sequences of goal-directed actions. We can think of them as *cognitive programs*, analogous to cognitive maps. They may take hold of behavior by specifying sub-goals, so that the resulting sub-plans are activated in sequence, each until its goal is met as registered by the perceptual systems; this gives us our familiar joint control by internal factors (the plan) and external ones (the present situation). In other cases, though, the sequence and the timing of actions may all be "pre-programmed" within the plan, and run off without reference to the external environment.

Imagery has been put to practical use in a variety of contexts. In desensitization therapy, a way of treating phobias, an image of the feared object or situation is made a CS for a relaxation response. Or we can represent (imagine) the intended outcomes of actions, as in goal-setting. We can also practice responses in our imagination rather than in the real world, with good effect (mental rehearsal).

Some images are unwanted. Obsessive thoughts, fears, and regrets may intrude insistently into our minds, to distress us or distract us from the task at hand. The natural tendency is to try to push them out of mind; but, ironically, this can make them persist all the more, for two reasons. First, some part of our minds must be on the lookout for them; and so, by this very watchfulness, they are held in the backs of our minds. Second, if we think the unwanted thought, and banish it by thinking of something else, that "something else" may become associated with the unwanted thought and so be added to the cues that can trigger it. Thus active thought suppression, or active speech suppression as in keeping secrets, can backfire.

Schemas are internal representations of *kinds* of things, persons, places, or events; they are skeletal knowledge structures, in which details are left unspecified, to be filled in by particular situations. Thus, because we know something about what professors in general are like, we know something about a particular professor even before we meet her if we know that she is one.

In the case of movements, a schema may consist of our knowledge of certain relationships. For example, we may have learned by experience how much force must be applied to a basketball, from varying distances, to get it to the basket. Then, given a specific value of one variable (here is where we are on the court right now), we solve the schematic equation to calculate how much force this throw requires. This may sound overly complicated, but even a tiny brain can do something like it, as when a honeybee corrects for the sun's apparent movement over time in plotting its course to a supply of nectar.

Schemas exist at various levels and can enter into complex lattice hierarchies. Thus our knowledge of how to make a sandwich—our sandwich-making plan or schema—can be called into play in the service of any of a number of higher-order goals: feeding ourselves, earning a living, being nice to someone else, etc. Conflicts can occur at various levels, too: our schematic wish to treat others nicely may clash with our schematic wish to be treated fairly ourselves.

There can also be schemas, or *scripts*, for kinds of events or sequences and for kinds of persons (*players*). The script for a heterosexual romance, for example, involves two players, a Guy and a Girl, in our society; and we know certain things that, in general, are expected of each. Unfortunately, we have also some idea of what to expect from a Guy who plays his part ineptly—a Jerk.

Schemas can be linked in turn to emotion or *affect*, and activation of a schema may activate its emotional component (schema-driven affect). If we don't like professors and we learn that Joe is a professor, we may be prepared to dislike Joe before we ever meet him.

The network of associations among schemas may be extraordinarily rich. Our analysis of a "simple" orthodox Hindu taboo against a widow's eating fish showed that the taboo is related to very general conceptions of what marriage is, what a family is, and even what the universe is like—whether misfortunes just happen, or are just punishments when they do.

How do schemas influence action? Some specify rewarding or punishing consequences directly. Or they may be linked to other, emotion-laden schemas, such as our belief that fairness is a good thing or that acceptance of certain duties is part of being a good spouse. We see that an intimate relationship between motivation and cognition—between what we do and what we believe—is beginning to take shape.